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WEEDS AS RESERVOIRS FOR NEMATODES THAT THREATEN FIELD CROPS AND NURSERY PLANTS

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The role of weeds in establishing and altering nematode populations:

On a world-wide basis, plant parasitic nematodes annually rob man of food and fiber valued at billions of dollars (2). It is often overlooked that weeds are partners which greatly alter the probability of an unwanted nematode becoming established in a new area.

Fig. 1. Root of Fatoua villosa with galls caused by Meloidogyne incognita.

The important role of weeds in altering the risk of a nematode pest spreading to a new area is dependent on several principles. Nematodes unaided move only a few feet in a year, but with the aid of man, animals, wind, and water, nematodes move great distances. Plant parasitic nematodes are obligate parasites, and not all cultivated crops serve as suitable hosts. Time is a primary enemy of nematodes, since their numbers will decline if they are not transported to an area where there is a suitable host. In the absence of a cultivated host, weeds often serve as transitional hosts on which nematodes can survive. Among the diverse natural flora along roadsides and around homes, fields, and nurseries, usually there are weed hosts on which plant parasitic nematodes may become established, reproduce, and persist for years until they are transferred to a nursery, field, or grove where the nematode may have the potential to cause severe economic loss.

Studies throughout the world confirm that weeds and noncultivated plants serve as reservoirs for nematodes which threaten cultivated crops. For example, in Nigeria weeds in more than 20 plant families were found to serve as hosts on which populations of root-knot nematodes (Meloidogyne spp.) increased during the dry season after annual crops were harvested (4). In southern Brazil there are 3 species of root-knot nematodes that reduce soybean yields. One study indicated that there are at least 16 weeds found in soybean fields that are reservoirs of one or more of these species of root-knot nematodes (1). In southern United States, nutsedge (Cyperus sp.) is a serious weed pest that has been found to be a factor in maintaining harmful populations of many nematodes (3, 5).

Fig. 2. Weed hosts of Pratylenchus penetrans growing with Boston fern in propagation bed.

The distribution of weed hosts alter the nematode population distribution patterns normally associated with a given cultivated crop (6). When surveying to determine which nematode species are associated with cultivated crops or when analyzing plant problems, weeds should be sampled separately so that the nematodes associated with weeds do not cause the types and numbers of nematodes associated with a cultivated crop to be misrepresented.

Examples of nematodes associated with weeds in Florida nurseries.

Some recent observations in Florida nurseries indicate that careful weed control should be practiced in order to reduce the spread of nematodes which may cause economic loss or affect the certification status of a nursery. For example, a species of root-knot nematode, Meloidogyne

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incognita Kofoid & White, was found to cause galls on Saururus cernuus L., lizard's tail, a weed that is common in peat bogs. One nurseryman who used peat from his own property also had root-knot nematodes on this weed in plant propagation beds. Thus, this weed host was a potential source from which this species of root-knot nematodes could spread throughout the nursery operation.

The root-knot nematode, M. incognita, was found in another nursery infecting Fatoua villosa, (Thumb.) Nakai, a weed that may easily spread within nurseries. This weed was scattered among container-grown plants on raised greenhouse benches, and the roots of this weed had numerous galls caused by root-knot nematodes (Fig. 1).

In another nursery many root-lesion nematodes, Pratylenchus penetrans Cobb, were found infecting crabgrass, Digitaria sanguinalis (L.) Scop., and lady's sorrel, Oxalis corniculata L. These two weeds were growing in propagation beds of Boston fern, Nephrolepis exaltata (L.) Schott, and were potential reservoirs from which nematodes could spread to other parts of the nursery (Fig. 2).

Two other weed species, Oxalis stricta L. and Phyllanthus amarus Schum. & Thon., were found harboring burrowing nematodes, Radopholus similis (Cobb) Thorne, in several Florida nurseries. These weeds were not previously known to be hosts of the burrowing nematode which may cause damage to nursery crops and affect the certification status of a nursery. These weeds and other weed hosts of the burrowing nematode should be carefully controlled with a nursery sanitation program.

Survey and detection.

1. Weeds should be sampled, especially in high risk areas for pest introduction, to detect whether they are harboring plant parasitic nematodes of quarantine significance.

2. To avoid an erroneous diagnosis of a plant problem, roots and soil from weeds should not be mixed with the roots of plants being submitted for analysis of a nematode problem.

3. If the plant species is not known to the collector, weed specimens should be submitted according to instructions in Nematology Circular No. 64.

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